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Microfungi from Costa Rica. A new species and a new combination in *Codinaea*

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Abstract — *Codinaea delicata* sp. nov., a new microfungus (hyphomycete) collected on decaying leaves of an unidentified plant, is described and illustrated. It is distinguished by synnematous determinate conidiomata and monophialidic and polyphialidic conidiogenous cells that produce subreniform unicellular hyaline conidia with a single unbranched setula at each end. *Codinaea dendroidea* comb. nov. is proposed, and a key to synnematous *Codinaea* species is provided.

Key words — asexual fungi, systematics, leaf litter

Introduction

Maire (1937) erected *Codinaea* for the type species, *C. aristata*. He characterized the genus by distinct single brown to pale brown conidiophores that form a more or less fasciculate circle around a dark brown thick-walled septate seta. The conidiogenous cells were mono- or polyphialidic, terminal, determinate or with a few sympodial extensions and with distinct funnel-shaped flaring sometimes collapsed collarettes at the conidiogenous loci and producing unicellular or septate falcate to lunate hyaline conidia with a filiform appendage at each end. Hughes & Kendrick (1968), who added twelve species and expanded the generic concept by including species without setae and with synnematous conidiomata, considered the conidium ontogeny "phialidic" and conidiogenous cells with distinct funnel-shaped collarettes as primary generic characters. Gamundi et al. (1977), who examined several specimens

of *Dictyochaeta fuegiana* Speg. (the type species) collected on dead leaves of *Nothofagus dombeyi* (Mirb.) Oerst., considered *Dictyochaeta* (Spegazzini 1923) an earlier name for *Codinaea* (Maire 1937). The two genera share a phialidic conidium ontogeny with funnel-shaped flaring collarettes at the conidiogenous loci and erect straight septate brown setae accompanying the conidiophores. However, in *Dictyochaeta fuegiana* the conidia are cylindrical, curved, unicellular, and hyaline and lack appendages. Molecular evidence provided by Réblová & Winka (2000), were commented upon and accepted by Seifert et al. (2011) and Li et al. (2012), who supported segregation of *Codinaea* and *Dictyochaeta*. Li et al. (2012) recommended that species with filiform appendages be retained in *Codinaea* while taxa lacking appendages be placed in *Dictyochaeta*.

During a 2012 fungal conservation workshop at the University of Costa Rica, more than 250 samples of dead plant material colonized by microfungi were collected in several forests of Cartago Province, Costa Rica. Among these samples was a conspicuous synnematous fungus, an apparently undescribed *Codinaea* species, which we describe and illustrate here.

Materials & methods

Individual collections were placed in paper and plastic bags taken to the laboratory and treated according to Castañeda (2005). Mounts were prepared in polyvinyl alcohol-glycerol (8 g PVA in 100 ml of water, plus 5 ml of glycerol) and measurements made at a magnification of ×1000. Micrographs were obtained with a Zeiss Axioskop 40 microscope (Germany).

Taxonomy

Codinaea delicata R.F. Castañeda, Granados & O. Castro, **sp. nov.** Figs 1, 2

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Differs from other synnematous *Codinaea* species by the smaller size and different shape of its conidia (sublunate to subreniform).

Type Costa Rica, Cartago Province, Orosi, Rio Macho, 9°45N 83°51′W, on decaying leaves of unidentified plant, 12 July 2012, coll. M. Granados, V. Vargas, G. Arroyo & I. Castro (**Holotype**: USJ 83283).

Etymology: Latin, *delicata*, means delicate, dainty, pretty.

Conidiomata on the natural substrate synnematous, scattered, determinate, 200–250 µm tall, 20–25 µm wide at the base, dark brown below and brown toward the apex, amphigenous. Mycelium superficial and immersed, composed of septate, branched, brown, smooth-walled hyphae 1–3 µm diam. Conidiophores distinct, erect, septate, closely packed in the synnematal stipe, slightly divergent toward the apex, 3–4 µm diam, brown to dark brown, smooth. Conidiogenous cells mono-and polyphialidic, integrated, 17–25 × 3–3.5 µm, mostly determinate, but sometimes indeterminate with

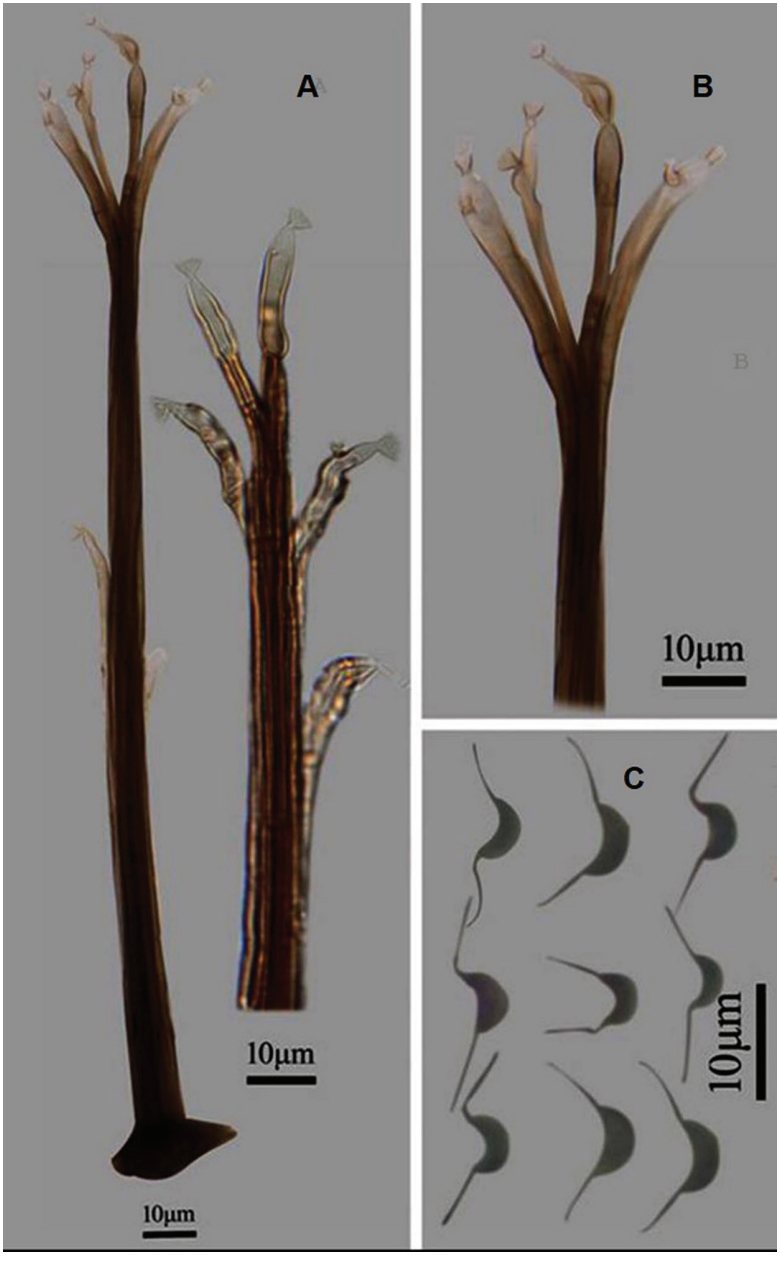

Fig. 1. *Codinaea delicata* (ex holotype USJ 83283). A–B. Conidiomata, conidiophores and conidiogenous cells. C. Conidia.

Fig. 2. *Codinaea delicata* (ex holotype USJ 83283).
Conidiomata, conidiophores, conidiogenous cell and conidia. Scale bars = 10 μm.

few sympodial extensions, terminal, integrated, brown to pale brown, with 1–3 funnel-shaped collarettes, 2.5–4 μm diam. and 3–4 μm deep. Conidia sublunate to subreniform, acuminate at the ends, unicellular, 6–7× 4–5 μm, hyaline, smooth-walled, with a filiform appendage, 7–9 μm long at each end; accumulating in white mucilaginous masses.

Notes: Among 41 *Codinaea* species recorded in Index Fungorum (2012), only one has synnematous conidiomata: *C. obesispora* S. Hughes & W.B. Kendr. That species and our new combination *C. dendroidea* (see below) share this character with *C. delicata*, but their conidia are falcate to broadly falcate and larger and so cannot be confused with those of *C. delicata*.

Three monematous *Dictyochaeta* species (*D. renispora* Whitton et al., *D. tilikfrei* Bhat & B. Sutton, *D. tropicalis* Bhat & W.B. Kendr.) are somewhat similar to *C. delicata*. *Dictyochaeta renispora*, found on decaying leaves of *Freycinetia excelsa*, *F. multiploa,* and *Pandanus* sp., has monophialidic conidiogenous cells with several percurrent extensions and ellipsoid to reniform, aseptate conidia, rounded at both ends, 6–8× 3–4 µm, with a filiform, 6–12 µm long appendage at both ends (Whitton et al. 2000). *Dictyochaeta tilikfrei,* found on decaying branches of an unidentified plant, has polyphialidic conidiogenous cells and broad fusiform to falcate, aseptate conidia, guttulate on the concave side, 20–25 × 10–12 µm, and obtuse at both ends with a filiform 6–12 µm long appendage at each end (Bhat & Sutton 1985). *Dictyochaeta tropicalis,* found on decaying leaves of an unidentified plant, produces ellipsoid to drop-shaped aseptate conidia, pointed at the apex, truncate to obtuse at the base, 7.5–9.5 × 3–5 µm, with a filiform straight 2.5–3 µm long apical appendix and a filiform curved ≤3.5 µm long appendix arising from one side of the broadly truncate base (Bhat & Kendrick 1993). No other monematous *Dictyochaeta* or *Codinaea* species are similar to *C. delicata*.

Codinaea dendroidea (Kuthub.) R.F. Castañeda, W.B. Kendr. & Minter, **comb. nov.**

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≡ *Dictyochaeta dendroidea* Kuthub., Trans. Brit. Mycol. Soc. 89: 411 (1987).

This new combination is proposed because *Dictyochaeta dendroidea* has characters that fit the generic concept of *Codinaea*. It has synnematal conidiomata and polyphialidic conidiogenous cells with several inconspicuous lateral and terminal collarettes, and its conidia are falcate, hyaline, and with a filiform appendage at each end (Kuthubutheen 1987).

Key to synnematous *Codinaea* species

1. Conidia short and broad sublunate to subreniform, acuminate at the ends, unicellular, 6–7 × 4–5 µm, hyaline, smooth-walled, with a filiform appendage 7–9 µm long at each end ..... *C. delicata*

1. Conidiomata not sublunate or subreniform 2

2. Conidia falcate, unicellular, 12.5–16 × 2–3 µm, hyaline, smooth-walled, with a filiform appendage ≤6 µm long at each end ..... *C. dendroidea*

2. Conidia broadly falcate, unicellular, 17–21 × 5–6 µm, hyaline, smooth-walled, with a filiform appendage ≤6 µm long at each end ..... *C. obesispora*

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